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This report describes the computer programs which produce the seismic data day tapes for the Global Digital Seismic Network from the station seismic tapes. The programs execute on a D.E.C. PDP 11/34 digital computer using the UNIX operating system and are written in C language.

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DAY TAPE PROGRAMS

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TABLE OF CONTENTS

TABLE OF CONTENTS

1.   Introduction

This document describes the design of the day tape computer system including the following:

Design Philosophy - Basic philosophy by which the system was designed.

Permanent Data Edit - Enter, modify or list permanent data for stations or delete stations.

Tape Read - Read tape and store data in data base.

Log Update - Human review and update of system, station, and component status and review and update of log comments.

Day Tape Write - Write day tape.

Day Tape Data Release - Release files used to produce day tapes.

Day Tape Update - Add "late stations" to day tape.

Day Tape Copy - Copy day tape and/or print logs.

System Review - Displays data in system and system parameters.

Computer to Computer Control - Allow 11/34's to communicate via two special files.

Tape Compare - Program to compare data on input seismic tape and day tape.

Enter Time Corrections - Program to put in time corrections when they are not automatically entered due to the data on the header of the tapes.

Enter Calibration Data - Program to enter or correct the calibration data manually.

Data Purge - Purge the data from the system.

Data Complete - Program to set data complete and ready to write for a station.

UNIX System Crash Repair - Check and correct file systems after crash.

Day Tape System Crash Repair - Check and correct day tape file system after crash or disk failure, etc.

2. Design Philosophy

Due to the high number of tapes that the system must process, the most important constraint on the system is that it be highly efficient and be as automatic as possible. On an average three full reels of station data must be read into the system and about 1.4 network day tapes need to be generated per work day (see the report "The Global Digital Seismograph Network-Day Tape" by John P. Hoffman, Open-File Report 80-289 printed by U.S. Geological Survey for format of day tapes). To provide an adequate safety factor the design goal was set to be able to read six tapes and write three network day tapes in an eight hour work period. This goal was accomplished.

To meet this goal it was necessary to have all the data properly stored during one pass of the tape. Each one of the two or three components (long period, short period and intermediate period) had to be saved in separate files and the calibration signals had to be detected, fit to a sine wave and the amplitude, frequency and the time saved.

To reduce the amount of operator intervention, as much of the station's condition and operation as is possible are detected and saved by the system. The time corrections and time outages over an hour in duration are automatically detected and saved to be inserted in the station log. The only human input required for the SRO and ASRO stations is the station comments and whether the data between one station tape and the next is missing or will be provided later (calibration and time corrections for Worldwide stations must be entered manually). All the questions are asked at the beginning of the program in order to save the operator's time.

The system was designed to be a self adapting system. The number of days of data that can be stored on the system, the average amount of data for each station and the average amount of data for a set of day tapes for a day are all continuously corrected based on the amount of data being processed. These values are used to control the storing of data in the mass storage. The number of days of data that can be stored in the mass storage is determined by the size of the mass storage and the average amount of data for a twenty four hour period. This value, called the system span, controls the placement of data in the mass storage and the default stop time for reading in data from a station tape. As the data is written on day tapes and released, the upper limit is reestablished based on the system span. The amount of data written on a day tape is used to determine the average amount of data for a twenty four hour period.

The proper storage of the data is very important as there are two computers simultaneous accessing the mass storage and the mass storage is divided into ten "file systems" due to restrictions within the operating system (UNIX sixth edition). The mass storage consists of two RP06 disk drives each having 174 million bytes of memory. The system is designed so that one computer writes the data on the mass storage; whereas, the other computer reads the data and produces the

day tapes. The data is organized so that the computer reading the
data uses one drive and most of the data written by the other computer
is to the other disk drive. A "file system" is assigned to a particu-
lar day the first time that data for the day is stored. Normally all
the data for the day is stored on the assigned file system. A count
of the number of free blocks on each file system is maintained and
each time a station tape is read, a check is made to determine if the
station's data for the day is expected to fit on the "file system".
This determination is based on the average amount of data normally re-
ceived for the station per day. If it is expected that the data will
fit, it is written on the "file system"; otherwise, the other "file
systems" are checked. If while writing the data on the "file system"
all the space on the "file system" is used, the file for which there
is no more room is moved to an alternate file system. If there is not
enough room on any file system either this tape is entered in a reread
table or room is obtained by purging data for another tape and that
tape is entered in the reread table. The algorithm used is designed
to minimize the number of tapes which must be reread.

        When a tape needs to be reread, all the operator needs to do is
mount the tape and answer the initial tape verification questions and
then the program using the reread table automatically determines the
proper place to begin storing data.

        By adding as much logic as possible to the programs, and by pay-
ing close attention to the efficiency of the programs, a very easy to
operate and efficient system has been produced.

3.   Permanent Data Edit, DTPERM

        This program is to add, modify, list, and delete permanent files
on the systems.

3.1 Standard Operations and Messages

        The program is initiated by entering:

        dtperm<CR>

in response to the system request for next action designated by "%".

The first message of the program is:

add, list, modify or delete permanent data

This message is followed by the first question:

function?

A response beginning with "a" designates that a file system or a station will be added. A response beginning with "m" designates that a file system, a station or the control data will be modified. A response beginning with "l" designates that the file system, a station or the control data will be listed. A response beginning with "d" designates to delete a file system or a station.

The next question:

item?

determines what will be added, modified, listed or deleted. A response beginning with "f" designates a file system will be worked with. A response beginning with "c" designates the control file will be worked with. A response beginning with "s" designates a station is to be worked with.

3.1.1   File System

This section describes the questions and answers required to add, modify, list or delete a file system.

The file system to be worked with is determined by the question:

file system = /dev/rpxx?

where xx is the number of the file system. Enter the two digit file system number followed by <CR>. This question is not asked when the function is list.

The program then will check the size of the file system and print:

file system has nnnn free 2000 byte records.

where nnnn is the number of free blocks. This is not printed for the functions delete and list.

3.1.1.1   Add or Modify File System

The number of 2000 byte blocks for the file system is entered in response to the question:

        size = nnnn?

where nnnn is the current number of blocks for the file system.   If the current is correct enter <CR> else enter the correct number of blocks in integer form.

The number of free blocks is determined by the question:

        free = nnnn?

where nnnn is the number of free blocks for the file system.   If the current is correct enter <CR> else enter the correct number of free blocks in integer form.

3.1.1.2   List File System

No additional questions are asked when the listing of file systems is desired.   All of the file systems are listed in the form:

        file system   size   free
        /dev/rpxx   nnnn   nnnn
            .   .   .
            .   .   .
            .   .   .

3.1.1.3   Delete File System

No additional questions are asked when the deleting of a file system is desired.

If any data is found on the file system the messages

        data on <file name>
        can not delete /dev/rpxx

are printed and the file system is not deleted.

3.1.2   Control

This section describes the questions and answers required to modify and list the system control file.

3.1.2.1   Modify Control

The average amount of volume data can be modified by the question:

amount of data for volume c = f.f?

where c is the volume number and f.f is the current average amount of data for that volume. If the current amount is correct enter <CR> else enter the floating point number designating the new amount followed by <CR>.

The approximate size of the system span is printed in the message:

Approximate size of system span is f.f

where f.f is the approximate size of the system span.

The system span is asked for by the question:

system span = f.f?

where f.f is the current system span. If it needs no modification enter <CR> else enter the floating point number of the new system span followed by <CR>.

The next questions are to modify the dates on the system.

earliest day on system = yyyy,ddd?
latest day on system = yyyy,ddd?
date of last volume 1 day tape = yyyy,ddd?
Upper limit of system span = yyyy,ddd?

where yyyy,ddd is the current date on the system for each entry. If the current date is correct enter <CR> else enter the correct date for each question.

The warning message:

Warning. Upper limit must not be less than vol.1 date
or greater than vol.1 date plus system span.

is printed if the dates are not in the correct sequence.

3.1.2.2   List Control

No further questions are asked when list control is desired. The data listed is:

        amount of data for each volume
        system span
        earliest day on the system
        latest day on the system
        date for last volume 1 day tape
        system span upper limit
        system cycle beginning day
        time between reading and writing
        number of stations
        reread information

3.1.3   Station

This section describes the questions and answers required to add, modify, list, and delete a station.

The station to be added, modified, listed, or deleted is determined by the question:

        station id?

to which the two or three digit station id is entered followed by <CR>.

3.1.3.1   Add Station

The system is determined by the question:

        system?

to which the operator enters w for Worldwide, a for ASRO, h for HGLP or s for SRO followed by <CR>.

The number of LP, SP, and IP channels is received in response to the question:

    n mm ch?

where n is the default number of channels and mm is the mode. If the default number is correct enter <CR> in answer to the question else enter the correct number followed by <CR>.

The sample rate for LP, SP, and IP channels is asked for by the question:

    mm sample rate nn?

where mm is the mode and nn is the default sample rate. If the default number is correct <CR> is entered else enter the correct sample rate followed by <CR>.

The name of the station is entered, in five or less characters, as the answer to the question:

    station name?

The location is entered in answer to the question:

    location?

The location is entered in up to 52 characters followed by <CR>.

The next question is:

    latitude?

The latitude is entered followed by <CR>.

The longitude is asked for by the question:

    longitude?

Enter the longitude followed by <CR>.

The next question is:

    elevation?

The elevation is entered followed by <CR>.

The average amount of SP and IP data is entered in response to the question:

    avg.amt. mm data?

where mm is either SP or IP. Enter the number of 2000 byte records that will normally be used for each days data of this mode.

Next the station log comments are listed and the question:

enter two lines of new comment(80 char.max)

If <CR> is entered the comments will remain as they are. If anything
other than <CR> is entered the comments will be changed to what is en-
tered.

The next question is:

Which component log lines 26-75 should be added?

A <CR> is entered if none of the component data log calibration com-
ments are to be added. If LP, SP or IP log lines need addition enter
l<CR>, s<CR> or i<CR>. If l, s or i is entered the statement:

Normal ed rules apply. Enter w and q when done.

is printed. Then the log lines can be added.

After entering q the program will produce the message:

Calibration data updated.

The component log question is repeated until a <CR> is entered
which terminates the program.

3.1.3.2   Modify Station

Each station may have a number of records for the permanent data.
Each of these records has a period for which the record is valid. In
order to determine which record to be used for modify the system
prints the record number and the beginning and ending dates of this
period in the following form.

record	beginning date	end date
1	1979,1	1980,24
2	1980,42	1980,45
.	.	.
.	.	.
.	.	.
.	1980,54	end

The program asks which record is to be modified by the question:

record to be modified?

The record to be modified should be entered. If a new record is to be
added after the last record, a value one greater than the last should

-9-

be entered. If a record is to be deleted enter the record number im-
mediately followed by d. No other questions are asked when a record
is deleted.

The beginning date is asked for by the question:

        beginning date = YYYY,ddd?

If the beginning date is correct, enter <CR>; otherwise enter the
correct beginning day.

If the record is not the last record, the ending date is asked by
the question:

        End date = YYYY,ddd?

If the end date is correct, enter <CR>; otherwise, enter the correct
end date.

By changing the beginning and ending date, the dates of the other
records are also modified. The procedure is to remove the modified
record from the other records changing the beginning date of the
record following the modified record and then merge the modified
record into this set of records adjusting the other records' beginning
and ending dates accordingly. This procedure will produce the desired
results if the end dates of records are modified rather than the be-
ginning dates of the following record when it is necessary to change
the date or when one record ceases to be valid and the next one
starts.

The next question:

        system = x?

where x is the current system. If modification is required enter the
new system followed by <CR> else enter <CR>.

The next question is to modify the number of channels:

        n mm ch?

where n is the current number of channels and mm is the mode. If no
change is desired enter <CR> else enter the new number of channels
followed by <CR>.

The sample rates are modified by the questions:

        mm sample rate f.f?

where mm is the mode and f.f is the current data. If the sample rate
needs to be changed enter the new sample rate followed by <CR> to the
correct question else enter <CR> to the question.

The name of the station is modified by the question:

    station = xxxxx?

where xxxxx is the current station name. If the name is to be modi-
fied enter the new name followed by <CR> else enter <CR> alone.

    The location can be modified by the question:

    location = xxx...x?

where xxx...x is the current station location. If a change is desired
enter the new location, in 52 or less characters, followed by <CR>
else enter <CR> alone.

    The next question:

    latitude = x?

where x is the current latitude. If it needs to be modified enter the
new latitude followed by <CR> else enter <CR>.

    The longitude is modified by the question:

    longitude = x?

where x is the current longitude. If no modification is needed enter
<CR> else enter the new longitude followed by <CR>.

    The next question is:

    elevation = x?

where x is the current elevation. If the current elevation is correct
enter <CR> else enter the new elevation followed by <CR>.

    The average amount of SP and IP data is modified by the question:

    avg.amt. mm data = xx?

where mm is either SP or IP and xx is the current entry.   If the
current entry is correct enter <CR> else enter the number of 2000 byte
records that will normally be used for each days data of this mode.

    The calibration frequency and the average calibration value for
each mode and channel are modified by the questions:

    calibration frequency for mm c f.f?
    avg.calibration value for mm c v.v?

where mm is the mode, c is the channel number, f.f is the current fre-
quency for the printed mode and channel and v.v is the current average
calibration value for the printed mode and channel.   If the value

printed in each question is correct enter <CR> else enter the new
value.   These two questions will be repeated for each mode and channel
for this station.

Next the station log comments are listed and the question:

enter two lines of new comment(80 char.max)

If <CR> is entered the comments will remain as they are. If anything
other than <CR> is entered the comments will be changed to what is en-
tered.

The next question is:

Which component log lines 26-75 should be modified?

A <CR> is entered if none of the component data log calibration com-
ments are to be modified. If LP, SP or IP log lines need modification
enter l<CR>, s<CR> or i<CR>. If l, s or i is entered the statement:

Normal ed rules apply. Enter w and q when done.

is printed. Then the log lines can be modified.

After entering q the program will produce the message:

Calibration data updated.

The component log question is repeated until a <CR> is entered
which terminates the program.

3.1.3.3   List Station

Each station may have a number of records for the permanent data.
Each of these records has a period for which the record is valid.   In
order to determine which record to be used for list the system prints
the record number and the beginning and ending dates of this period in
the following form.

record	beginning date	end date
1	1979,1	1980,24
2	1980,42	1980,45
.	.	.
.	.	.
.	.	.
.	1980,54	end

If there is more than one record the program asks which record is to be listed by the question:

        record to be listed?

The record to be listed should be entered.

    The information to be listed is:

        average amount of data for each mode
        start and stop times for 2 most recent tapes
        calibration data for each mode and channel
        station name
        type
        location
        number of channels for each mode
        sample rate for each mode
        latitude
        longitude
        elevation

    The list function lists the station log by first printing "Station log comments" and then printing the two lines of the station log. Next the user is asked which data component log should be listed by the question:

        Which component log lines 26-75 should be listed?

The acceptable responses are long<CR>, short<CR>, intermediate<CR> or <CR>. Only the first character of the responses are used so l<CR>, s<CR> and i<CR> are accepted provided that the station has the component requested. If just the <CR> is entered, none of the component logs are listed; otherwise, the 50 lines of the requested log are printed and the question is repeated until a <CR> response is received and then the program terminates.

3.1.3.4   Delete Station

    There are no further questions ask when the delete station function is executed. Each day station file is checked to determine if there is any data present. If no data is found the day station file is deleted. If data is found on any day station files the message:

        data present for yyyy,ddd

is printed.

If no data is found on any day station file the station is deleted.

If data is present for any day the message:

data present - cannot delete

is printed.

4.   Read Seismic Tape and Store Data Program, DTREAD

This program reads the seismic tape and stores the data in the day tape data base. The operator specifies the channels, the starting time, and the stopping time or number of days of data to be stored on the data base.

4.1 Standard Operation and Messages

The program is started by entering

dtread [-lp]<CR>

in response to the system request for next action designated by "%". The presence of the -lp option will cause any tape error messages or beginning of event messages to be printed on the line printer. If the -lp option is absent, the standard output device is used for all messages. The first message of the program is:

read seismic tape and store data program

This message is followed by the standard initial header messages and the question:

std parameters?

A response beginning with "y" will cause the automatic use option to be enabled for tape errors, beginning of event and timing error messages to be suppressed, and the next four questions described in this section to be suppressed with standard options assumed. A response beginning with "n" will cause the standard automatic correction of errors and message suppression questions to be asked followed by the following question.

store sp channel?

A response beginning with "y" will cause the data for short period

channel one to be stored on the data base, while a response beginning
with "n" will cause no short period data to be stored on the data
base. The standard response is "Y".

    store ip channels?

This question is only present for Worldwide tapes. A response begin-
ning with "Y" will cause the data for intermediate period channels
one, two and three to be stored on the data base, while a response be-
ginning with "n" will cause no intermediate period data to be stored
on the data base. The standard response is "Y".

    start time?

The response to this message must be Y,ddd,hh:mm:ss.ss<CR>, an accept-
able shortened version, or a null response. For a null response, which
is the standard response, the starting time is assumed to be the
starting time of the tape or, if part of the tape has been previously
read and stored on the data base, the time when the previous storing
of data from the tape was terminated.

    stop time?

The response to this message must be Y,ddd,hh:mm:ss.ss<CR>, an accept-
able shortened version or a null response. If a time is specified,
the program will stop storing data on the data base when the time
corresponding to the data is greater than or equal to the specified
stop time. A null response will cause the following question to be
asked.

    nr of days to store?

The response to this question should be the number of days of data to
be stored on the data base. A partial day counts as a day. A null
response will cause the program to store data until an end-of-file is
encountered on the seismic tape, the data time is greater than the
upper limit of the System Time Span or an abort condition is encoun-
tered.

    will data prior to Y,ddd,hh:mm:ss.ss
    be supplied later?

This question is produced when no history of tapes read exists for
time prior to the tape being read. A response beginning with "n" will
cause the first day's data from the tape to be considered complete. A
response beginning with "Y" will cause the program to assume the tape
prior to this one will be entered later and the first days data from
the tape not to be considered complete unless it starts at the begin-
ning of the day.

is there data between this tape and Y,ddd,hh:mm:ss.ss
          to be supplied later?

This question is produced when tapes of a later date than the tape
currently being read have previously been read. A response of "n"
will cause the data between this tape and the specified time to be
marked complete. A response of "Y" will cause the program to assume a
tape is missing and to not mark the data between the tapes complete.

          data missing between Y,ddd,hh:mm:ss.ss and Y,ddd,hh:mm:ss.ss
          will it be supplied later?

This question is produced when there is a gap in time between the tape
being read and the tape in history. A response of "n" will cause the
data between the times specified to be marked complete. A response of
"Y" will cause the program to assume a tape is missing between the
specified times the data will not be marked complete.

     Once these questions have been answered, the program will begin
storing data on the data base. After each day's data has been suc-
cessfully stored, one or more of the following messages shall be pro-
duced:

          lp data complete to Y,ddd,hh:mm:ss.ss
          sp data complete to Y,ddd,hh:mm:ss.ss nnnnn records
          ip data complete to Y,ddd,hh:mm:ss.ss nnnnn records

     When all the specified data from the seismic tape has been stored
on the data base, the program terminates.

4.2 Error and Warning Messages

     The following error and warning messages may be produced.

          Y,ddd,hh:mm:ss.ss data duplicates data on disk

This error message is produced when an attempt is made to load data on
the disk and there is already data for the specified station and time.

          error! tape time backed up to Y,ddd,hh:mm:ss.ss

The time on the station tape backed up in days or more than one
minute. This is caused by an error on the station tape.

          disk space not available

Disk space has been exhausted and this day is later than any on the
system.

warning! tape must be reread at later date

This warning is produced when the entire tape is not loaded on the
disk for any reason.

                warning! dtrepair needs to be run

This warning is produced when an error is found on one of the files.

5.   List and Modify Logs, DTLOG

     This program allows the user to list and modify the comment por-
tion of the station and data log and allows the user to print the
full station and data log.

5.1 Standard Operation and Messages

     The program is initiated by entering

          dtlog<CR>
          or
          dtlog -lp<CR>

in response to the system request for the next command indicated by
the "%" prompt. The presence of the -lp option causes the log to be
printed on the line printer when the print log function is used.   The
first message is:

          list, print or modify station and data log comments

Next the following question is asked:

          function?

The answer to this question is modify<CR>, list<CR> or print<CR>. On-
ly the first character of these responses are checked so m<CR>, l<CR>
and p<CR> are acceptable.

     The next question requests the id of the station to be listed or
modified.

          station id?

Enter the two or three digit station id followed by <CR>.

Each station may have a number of records for the comments and permanent data. Each of these records has a period for which the record is valid. In order to determine which record to be used for modify or list the system prints the record number and the beginning and ending dates of this period in the following form.

record	beginning date	end date
1	1979,1	1980,24
2	1980,25	1980,27
.	.	.
.	.	.
.	.	.
.	1980,54	end

If there is more than one record or the comments are to be modified, the program ask which record is to be used by the question:

        record to be <xxxxxx>?

where <xxxxxx> is the word "modified" or "listed". The record to be used should be entered. If a new record is to be added after the last record, a value one greater than the last should be entered. If a record is to be deleted enter the record number immediately followed by "d".

The remainder of the operation of the dtlog program depends upon the function being performed. This list and question is not produced for the print logs function.

5.1.1   List

The list function lists the station log by first printing "Station log comments" and then printing the two lines of the station log. Next the user is asked which data component log should be listed by the question:

        Which component log lines 26-75 should be listed?

The acceptable responses are long<CR>, short<CR>, intermediate<CR> or <CR>. Only the first character of the responses are used so l<CR>, s<CR> and i<CR> are accepted provided that the station has the component requested. If just the <CR> is entered, none of the component logs are listed; otherwise, the 50 lines of the requested log are printed and the question is repeated until a <CR> response is received and then the program terminates.

5.1.2   Modify

The beginning date is asked for by the question:

    beginning date = yyyy,ddd?

If the beginning date is correct, enter <CR>; otherwise enter the correct beginning day.

If the record is not the last record, the ending date is asked by the question:

    End date = yyyy,ddd?

If the end date is correct, enter <CR>; otherwise, enter the correct end date.

By changing the beginning and ending date, the dates of the other records are also modified. The procedure is to remove the modified record from the other records changing the beginning date of the record following the modified record and then merge the modified record into this set of records adjusting the other records' beginning and ending dates accordingly. This procedure will produce the desired results if the end dates of records are modified rather than the beginning dates of the following record when it is necessary to change the date or when one record ceases to be valid and the next one starts.

Next the station log comments are listed and the question:

    enter two lines of new comment(80 char.max)

If <CR> is entered the comments will remain as they are. If anything other than <CR> is entered the comments will be changed to what is entered.

The next question is:

    Which component log lines 26-75 should be modified?

A <CR> is entered if none of the component data log calibration comments are to be modified. If LP, SP or IP log lines need modification enter l<CR>, s<CR> or i<CR>. If l, s or i is entered the statement:

    Normal ed rules apply. Enter w and q when done.

is printed. Then the log lines can be modified. Refer to the description of ed in the UNIX documentation for the option allowable in ed.

After entering q the program will produce the message:

Calibration data updated.

The component log question is repeated until a <CR> is entered which terminates the program.

5.1.3 Print

The print function produces an image of the log as they will be recorded on tape.

For the print function the next question after the station question is:

Date?

The date should be entered as either four digits of year or the last digit of year followed by a comma and the day of the year. Next the log to be printed is requested by the question

log to be printed?

A carriage return or a<CR> designates both the station and data log. s<CR> or d<CR> designates the station or data log.

6. Day Tape Write Program, DTWRITE

This program writes the log and data on magnetic tape to produce a volume of day tape.

6.1 Standard Operation and Messages

The program is started by entering

dtwrite [-1p]<CR>

in response to the system request for next action designated by "%". The presence of the -1p option causes any printing of tape log to be

done on the line printer. If the -lp option is not present, the standard output device is used for all messages. The first message of the program is:

    write day tape program

Next the day of the tape is requested by the following question.

    day?

The response should be the day of the year for which the tape is to be written.

If no previous volumes have been written for this day tape, the following is a sample of the messages that will be produced.

    currently have 2.3 tapes of data with 25 stations.
    stations are averaging 125% of normal amount of data.
    it is expected that 3.1 tapes of data will be received.
    how many tapes will be produced?

The response should be the number of tapes that will be produced from this day's data.

The program determines which stations have data to be written on the day tape and the amount of data per station. The stations are sorted by their id's and the following information is printed.

    data available for day ddd
    id   station   amount
    nnn   sssss   .iiii
     .   .   .
     .   .   .
     .   .   .
    total   j.jjjj

where nnn is the station ID, sssss is the station name, .iiii is the portion of a tape required for this stations data, and j.jjjj is the portion of a tape for all of the data listed.

If j.jjjj is greater than one, the following message is produced:

    are stations thru nnn acceptable?

If j.jjjj is less than or equal to one, the following message is produced:

    is this list of stations acceptable?

A response to either of these questions beginning with the letter "y"

will cause the day tape to be written using the data from the stations specified. A response beginning with the letter "n" will cause the following message to be produced:

which stations should not be used?

The response should be the station ID's of the stations not to be written on the tape, separated by commas. The list of stations to be written on the tape is produced again deleting those which are not to be used and the total portion of a tape required for these stations(j.jjjj) is checked and one of the two previous questions is asked. This continues until an acceptable list is produced.

Prior to writing the tape, the following question is produced:

logs to be printed?

The acceptable responses include "a" for all logs, "n" for no logs, or a list of the types of logs to be printed separated by commas where "t" is for tape log, "s" is for station log, and "d" is for data log.

The tape to be written on should be mounted when the following message is produced:

mnt tape on mt1, type g

When the tape has been mounted, the operator should type ug or g where u, if present, is desired unit number if unit 1 is not to be used.

The tape log is written on tape and if requested printed. An end-of-file follows the tape log. For each station, a station log is written on tape followed by an end-of-file and if requested the station log is also printed. For each component of the station, a component log is written on tape followed by the component data and an end-of-file. If requested, the component log is also printed.

6.2 Error and Warning Messages

The following error and warning messages may be produced by the day tape write program.

no stations for day tape

No stations were found for the specified date or the operator eliminated all that were found.

warning! parity error, station nnn cp y,ddd,hh:mm:ss.ss

The longitudinal parity character generated by the day tape read program is not correct when read from the disk.

> failed to write day tape

The day tape write program has aborted.

7. Day Tape Data Release, DTRELE

This program releases the data used by DTWRITE.

7.1 Standard Operations and Messages

The program is initiated by entering:

        dtrele<CR>

in response to the system request for next command designated by "%".

The first message of the program is:

        program to release data used by dtwrite

The next message is:

        Day tape for yyyy,ddd volume v
        has the following stations:
        nnn...n

where nnn...n is the list of stations on the day tape for day yyyy,ddd
and volume number v. This message is followed by the question:

        should this data be released?

A response of "y" will cause the data to be released and this entry to
be removed from the table of data to be released, a response of "n"
will skip over this entry, and a response of "c" will cause the entry
to be removed from the table. This message and question is repeated
for each entry in the table.

Next the following messages are produced:

        earliest data on system is for yyyy,ddd
        last volume 1 day tape is for yyyy,ddd
        station tapes for yyyy,ddd should be read

After these messages the program checks the stations to determine
if they have any comments or changes in permanent data which are prior
to the earliest data. If a station is found with data prior to this
date the following message is produced:

        should permanent data for station nnn
        yyyy,ddd be removed?

where nnn is the station identification and yyyy,ddd is the date.   A
response beginning with "y" will cause the permanent data for this
station for the dates equal to and prior to the date listed in the
question to be removed. Any other response will cause the data not to
be removed. This question is asked repeatedly until all the stations
are checked at which time the message:

        all entries processed

is produced.   This message terminates the program.

8.   Day Tape Update Program, DTUP

        This program adds one or more station's data to an existing
volume of day tape.

8.1 Standard Operation and Messages

        The program is started by entering

        dtup [-lp]<CR>

in response to the system request for next action designated by "%".
The presence of the -lp option causes any printing of tape logs to be
done on the line printer. If the -lp option is not present, the stan-
dard output device is used for all messages. The first message of the
program is:

        update day tape program

        The volume of the day tape to be updated should be mounted when
the following message is produced:

        mnt tape on mt0, type s

When the tape has been mounted, the operator should type us or s where
u, if present, is desired unit number.

The tape log from the input tape is printed and the following question asked:

        update this tape?

A response beginning with "n" will cause the program to terminate. A response beginning with "y" will cause the updating to proceed.

        The program determines which stations have data to be added to the day tape and the amount of data per station. The following information is printed:

        data available for day ddd
        id   station   amount
        nnn   sssss   .iiii
        .   .   .
        .   .   .
        .   .   .

where nnn is the station id, sssss is the station name, and .iiii is the portion of a tape required for this stations data.

        The next question is:

        stations to be added?

The response should be the station ID's of the stations to be added to the tape, separated by commas.

        The tape to be written should be mounted when the following message is produced:

        mount tape on mt1, type g

When the tape has been mounted, the operator should type ug or g where u, if present, is desired unit number.

        Prior to updating the tape, the following question is produced:

        logs to be printed?

The acceptable responses include "a" for all logs, "n" for no logs, or a list of the types of logs to be printed separated by commas where "t" is the tape log, "s" is the station log, and "d" is the data log.

        The edition in the tape log is incremented by one.   A station table is created from the tape log, the new stations' information is added to the table, and the table is sorted. The new file numbers for each of the stations is calculated and the new tape log is written. The logs and data for the stations are copied from the input tape to the output tape with an appropriate change in the file numbers in the logs; and the logs and data for the new stations are inserted at the appropriate places.

8.2 Error and Warning Messages

The following error and warning messages may be produced.

no stations to be added, update terminated

No stations were found to be added to the day tape.

failed to write new day tape

The program has aborted before the new day tape was written.

station id on tape is nnn s/b nnn

The station id on a data record of the input day tape does not match
the expected value.

error on station nnn, xp data
time on input tape is
y,ddd,hh:mm:ss.ss s/b y,ddd,hh:mm:ss.ss

The time on a data record of the input day tape does not match the ex-
pected time.

error on station nnn
lp data missing from y,ddd,hh:mm:ss.ss to y,ddd,hh:mm:ss.ss

The data for the specified time period is missing on the input day
tape.

error: 1st rec is nnn bytes

The first record on the input day tape is not 2000 bytes long.

error: station log is nnn bytes

The station log is not 2000 bytes long.

error: station id is nnn s/b nnn

The station id on the station log is not the expected one.

error: rec n of data log is nnn bytes

Record 1, 2 or 3 of the data log is not 2000 bytes long.

error: 1st char of mode is c s/b c

The first character of the sampling mode did not match the expected
character.

9.   Copy Day Tapes, DTCOPY

This program copies a day tape, checks the input tape for errors, prints error messages and prints requested logs.

9.1   Standard Operation and Messages

This program is started by entering:

        dtcopy [-nc] [-lp]<CR>

where: -nc, if present, indicates no output tape is to be produced, and -lp, if present, causes any printing of tape logs to be done on the line printer.

The input day tape should be mounted when the following message is produced:

        mnt tape on mt0, type g

When the tape has been mounted the operator should type ug or g where u, if present, is desired unit number.

The output tape should be mounted when the following message is produced:

        mnt tape on mt1, type g

When the tape has been mounted the operator should type ug or g where u, if present, is desired unit number.

Prior to copying the tape, the following questions is produced.

        logs to be printed?

The acceptable responses include "a" for all logs, "n" for no logs, or a list of the types of logs to be printed separated by commas where "t" is for tape log, "s" is for station log, and "d" is for data log.

As the tape is read, it is checked for errors and error messages are printed.

9.2   Error and Warning Messages

The error and warning messages for the day tape copy program are
the   same   as those for the day tape update program (see 8.2) with the
exception of the first.

10.   System Review, DTREV

This program produces a Day Tape system report.   This program   is
started by entering:

        dtrev [-lp]<CR>

in response to the system request for next command designated by   "%".
The   option   -lp,   if   present, causes the output to be printed on the
line printer.

The first message of the program is

        program to produce system review report

This message is *followed by the volume* status   which   lists   the
volume number, the days for which the tapes for the volume number have
been written and released or are   not   needed (the   higher   numbered
volumes normally are not needed), the days for which the tapes for the
volume number have been written and not   released   and   the   days   for
which the tapes for the volume number have not been written.   The data
is listed for the volume numbers one through four.

The next set of messages list the status for each station in   the
system.   The   first column is the station identification.   The second
column is the list of days for which the station data was written   and
the data was released.   The third column is the list of days for which
the station data was written but the data has not been released.   The
fourth column is the list of days for which there is data available to
write a day tape for the station (this list include the   days   in   the
third   column).   The fifth column lists the days for which the data is
missing and all the volumes of tape for the   day   have   been   written.
The   final column lists the days for which the data is missing and not
all the volumes of tape for the day have been written.

The next set of message list the dates   and   station   identifica-
tions   for   those   tapes which must be reread.   These entries are pro-
duced whenever the reading of a station tape is   terminated   prior   to
the end of file on the station tape.   This set of messages is not pro-
duced if there are not any reread entries in the system control file.

11. Computer to Computer Control

Whenever two computers are connected to a third element there are problems involving which has control over the element. To resolve this problem in the Day Tape system, one computer connected to the common RP06 disk subsystem is the master and the other is the slave. The master performs all the file creation, writing and file deleting. The slave computer can only read the files (with one exception). When the file systems assigned to the RP06 disk subsystem are defined ("mounted") for the slave computer they are defined as read only file systems. This prevents UNIX from allowing any program from writing on a file through the file system operations. Due to this restriction only programs which only read the files can run on the slave computer. These programs are the Day Tape Write, Day Tape Update, Day Tape Copy, Day Tape Compare, Day Tape System Review programs and the Day Tape Permanent Data Edit and Day Tape Log programs when the list or print functions are used.

Due to the importance of being able to run the Day Tape Write program on the slave computer, a computer to computer control link has been created to enable the control information produced by this program to be used to update the Day Tape system file. Most of the computer time used by the Day Tape system is used by the Day Tape Read and the Day Tape Write programs. Therefore in order to distribute the Day Tape load over two computers it was necessary to be able to run Day Tape Write on the slave computer as the Day Tape Read program, reads the station tapes and writes all the data to the RP06 disk subsystem. The Day Tape Write program produces information regarding the stations and the amount of data written on the tape which needed to be written on the Day Tape system control file. This information is sent to the master computer through the computer to computer control link. The master computer then uses the data to update the system control file.

The computer to computer link consists of two fixed files and two special update programs. The two fixed files, slave to master and master to slave, are used by the two system update programs which have been modified so that every thirty seconds they read the files. They also check if any data has been written in a collector file on the "root" file system ("/dpcoll"). If any data has been written on the slave's computer collector file, the file is recreated and the data is written on the slave to master file. The master computer's update program checks its collector file and the slave to master file. If there are entries in either file, the data is used to update the information in the Day Tape system control file. If the data was received from the collector file, a new one is created. If the data was received from the slave to master file, a response is written on the master to slave file that the data was received by the master so that the slave can reset the slave to master file. All of the messages from slave to master and master to slave are numbered so that proper synchronization can be maintained.

The slave computer uses a special capability to write on the slave to master file. The slave computer determines the actual block numbers assigned to the file and writes those blocks at the device input/output level rather than the file structure level. By writing at this level, the slave computer is not restricted by the "read only" restriction imposed on the file system. The slave computer only uses the blocks assigned to the file by the master computer, thus it does not cause any conflicts with the master computer's block assignments.

12. Tape Compare, DTCMP

This program is used to compare a station tape to a day tape. The station tape is mounted on tape drive zero and the day tape is on tape drive one.

12.1 Standard Operations and Messages

The program is initiated by entering:

    dtcmp<CR>

in response to the system request for next command designated by "%".

The first message of the program is:

    program to compare station and day tapes

This message is followed by the standard tape messages and questions followed by the day tape mount message.

Prior to checking each component of data, the following message is produced:

    checking xP

where x is L, S, or I indicating the component being checked.

Next the program attempts to position both tapes to the beginning of the data to be compared. If there are any errors one of the following messages will be produced.

    No data on day tape

This message is produced when no data is found on the day tape for this station and component.

Data on day tape when nrchan = 0

This message is produced when there are no channels for the particular component on the station tape but data is present on the day tape.

Error in station tape

This message is produced when there is an error in the station tape which makes it impossible to proceed with the comparison.

Error in day tape

This message is produced when an error is detected in the day tape which makes it impossible to proceed with the comparison.

If it is possible to properly position both tapes to beginning of the long period data, the following message is produced.

day tape LP data starts at Y,ddd,hh:mm:ss.ss

where Y,ddd,hh:mm:ss.ss is the time the long period data starts on the day tape.

No data indicators from
Y,ddd,hh:mm:ss.ss to Y,ddd,hh:mm:ss.ss

This message is produced if the "no data indicators" is present in the long period data (the no data indicator is 000000(0) for SRO and ASRO and 177777(0) for Worldwide).

No station tape data for
Y,ddd,hh:mm:ss.ss to Y,ddd,hh:mm:ss.ss

This message is produced when there is no station data between the two times yet there is day tape data.

No day tape data for
Y,ddd,hh:mm:ss.ss to Y,ddd,hh:mm:ss.ss

This message is produced when there is no day tape data between the two times.

Timing error -
station time = Y,ddd,hh:mm:ss.ss,
day tape time = Y,ddd,hh:mm:ss.ss

If there is a timing error this message is produced showing the station time and the day tape time.

```
cmp err for ch n, at Y,ddd,hh:mm:ss.ss
st.data = m, dt.data = p
```

This message is produced when there is a compare error for the channel designated by n for the time designate by Y,ddd,hh:mm:ss.ss. The station data is in octal form designated by m and the day tape data is in octal form designated by p.

```
Error on station tape, time = Y,ddd,hh:mm:ss.ss
```

This message is produced if there was an error detected on the station tape.

```
Error on day tape, time = Y,ddd,hh:mm:ss.ss
```

If an error was detected on the day tape this error message is produced.

```
Day tape time discontinuity.
Expected time = Y,ddd,hh:mm:ss.ss
actual time = Y,ddd,hh:mm:ss.ss
```

This message is produced when the time of the data on the day tape is not the expected time.

```
Unexpected EOF on station tape
```

This message is produced when the station tape has an unexpected end of file.

```
Unexpected EOF on day tape
```

When an unexpected end of file occurs on the day tape this message is produced.

13.   Enter Time Corrections Program, DTTMCR

       This program is used to put in time corrections when they are not automatically entered due to the data on the header of the tapes.

13.1 Standard Operation and Messages

       The program is initiated by entering:

           dttmcr<CR>
```

in response to the system request for next command designated by "%".

The first message of the program is:

enter time correction program

This message is followed by the question:

station id?

The two or three character id for the station needing the time correction should be entered followed by <CR>.

The time of the time correction is entered in response to the question:

time of correction?

The time should be entered in the form y,ddd,hh:mm<CR>.

amount of correction(in milliseconds)?

The response to this question is the amount of time correction, entered in milliseconds.

time corrected to zero?

The acceptable responses to this question are y<CR> designating yes, n<CR> designating no and c<CR> which designates that the previous entry for this time should be canceled.

If there is no room for the time correction, the message:

no room for this time correction

is printed and the program terminates (there is only room for three time corrections per day).

The corrected values can be checked by running DTLOG using the print of station logs.


14.  Enter Calibration Data, DTCAL


This program is used for entering or correcting the calibration data manually.

14.1 Standard Operation and Messages

The program is initiated by entering:

    dtcal<CR>

in response to the system request for next command designated by "%".

The first message of the program is:

    enter calibration data program

This message is followed by the question:

    station id?

The two or three character id for the desired station should be entered followed by <CR>.

The time of calibration is entered in response to the question:

    time of calibration?

The time should be entered in the form y,ddd,hh:mm<CR>.

The component to be worked with is determined by the question:

    component?

The acceptable answers are l<CR> for long period, s<CR> for short period, and i<CR> for intermediate period.

The channel to be worked with is determined by the question:

    channel?

Enter the number of the channel to be worked with followed by <CR>.

The average amplitude is displayed in the question:

    amplitude a.a?

where a.a is the average amplitude. If the current amplitude is correct enter <CR> else enter the new average amplitude followed by <CR>

The average frequency is displayed in the question:

    frequency f.f?

where f.f is the average frequency. If the current frequency is correct enter <CR> else enter the new average frequency followed by <CR>.

The program loops back to the time of calibration question and keeps looping until a <CR> is given in answer to the time question.

The calibration values can be checked by running DTLOG using the print of data logs.


## 15. Data Purge, DTPURGE

This program is used to purge data from the system.


### 15.1 Standard Operations and Messages

The program is initiated by entering:

    dtpurge CR.

in response to the system request for next command designated by "%".

The first message of the program is:

    purge data program

This message is followed by the question:

    station id?

The two or three character id for the station needing data purged should be entered followed by <CR>.

The start time for the purge is entered in response to the question:

    start time y,ddd,hh:mm:ss.ss?

where y,ddd,hh:mm:ss.ss is the start time of the most recent input tape. If the purge is to start at the displayed time enter <CR> else enter the start time in the form y,ddd,hh:mm:ss.ss<CR> or an acceptable shortened version.

The next question is:

    stop time y,ddd,hh:mm:ss?

where y,ddd,hh:mm:ss.ss is the stop time of the most recent tape. If the purge is to terminate with the displayed time enter <CR> else enter the stop time in the form y,ddd,hh:mm:ss.ss<CR> or an acceptable

shortened version.

The final question is:

will this data be replaced?

An entry beginning with "n" will indicate that the data will not be replaced. Any other entry means that the data will be replaced.


## 16. Data Complete, DTCOMPLETE

This program sets that the data is complete and ready to write for a station. It is used when it was expected that data would be available between two tapes and then the data never became available.


## 16.1 Standard Operation and Messages

The program is initiated by entering:

dtcomplete<CR>

in response to the system request for next command designated by "%".

...e first message of the program is:

........ to set data complete for a station

This message is followed .. .. question:

station id?

The two or three character id for the desired station s. en-
tered followed by <CR>.

The next question is:

start time y,ddd,hh:mm:ss.ss?

where y,ddd,hh:mm:ss.ss is the stop time of the first tape. If this
time is correct enter <CR> else enter the correct start time in the
form y,ddd,hh:mm:ss.ss or an acceptable shortened version.

The final question is:

    stop time y,ddd,hh:mm:ss.ss?

where y,ddd,hh:mm:ss.ss is the start time of the second tape.  If this
time   is   correct   enter   <CR> else enter the correct stop time in the
form y,ddd,hh:mm:ss.ss or an acceptable shortened version.

    The final message is:

        data will be marked complete from yyyy,ddd through yyyy,ddd
        or
        no data will be marked complete

The first message is produced if everything is correct.  The start and
stop  dates are adjusted based on the data that is in the system.  The
second message is produced if the start and stop  times,  after  being
adjusted  for  the  data in the system or lack of it, indicate that no
days will be marked complete.


17.   UNIX Crash Repair Procedure


    The commands dcheck, icheck and restor have been modified to make
it  easier  to  repair damage to a file system after a system crash or
improper shutdown.  Every file and directory in the UNIX system is de-
fined  by an inode.  The inodes describe the file, the owner, the size
of the file.  The repair procedure involves clearing the inode of  any
file  or directory that has an error and then restoring the files from
the last dump tape for all the files that are on the tape and  have  a
cleared inode.

    The dcheck and icheck commands have been modified  to  make  more
tests  on  the  files and directories and to clear the inodes of those
with definite errors.  The restor command has a new option  "-z"  which
causes  the zeroed (cleared) inodes to be restored from the dump tape.
These procedures do not solve all the problems.  If blocks are used by
two or more files, the files need to be checked and the inodes for the
ones in error need to be cleared.  In many cases  the  modified  dates
for  the  files  will be earlier than the last dump tape date in which
case the inodes for both files can be  cleared  and  restored  without
checking the files.

## 17.1 Recovery Procedure

The following is a step by step procedure for recovering from most crashs. Steps two through eleven have to be performed for each file system used. There are several cases for which the following will not work.

1) Boot the system in a single user mode. This is done by entering 173030 into the console switches by pressing each of the digits in order and then pressing the "LSR" key on the processor console prior to booting. After this has been done, boot in the normal manner (the initial output on the terminal and the login message will not be produced).

2) Run dump to save the current contents of the file system on tape.

3) Run icheck in normal manner. If there are no multiple used blocks go to step five (multiple used blocks are indicated by a block number followed by "dup; inode =" followed by additional data).

4) Rerun icheck using the "-b" option with a list of the multiple used blocks. Note the inodes involved (the number immediately following "inode=").

5) Run dcheck with the "-r" option also use "-i" and list the inode reported in step four if step four was run. Note the pathnames of the inodes. If step four was not used go to step eight.

6) For each of the pathnames listed in step five, list the date the file or directory was last modified using "ls -ld pathname".

7) For each file with a modification date prior to the date of the last dump tape and every directory, clear the inode using the "clri" command. For the other files contact the owner to determine if it is better to restore the file or have the owner try to correct the file. Clear the inode of the files that the owners want restored.

8) Run icheck with the "-s" option reboot the system in the single user mode when icheck ends.

9) Run restor with the "z" option using the latest dump tape for the file system (not the dump produced in step two). This run will list the inode number of directories and files that are restored from the dump tape.

10) Run dcheck with the "-n" and "-i" options and list the inodes which were restored in the previous step. If some inodes are cleared by dcheck that were just restored by restor, return to step six and use the next older version of the dump tape.

11) Run icheck with the "-s" option.

12) Compare the list of inodes cleared by steps five, seven and ten with those restored by step nine. If any inodes were not restored, run restor using the "x" option followed by the list of inodes that were not restored and using the tape produced in step two.

13) Halt the processor, clear the console switches by pressing the "CLR" key then pressing the "LSR" key. Boot in the normal manner.

14) Inform the owners of all the files that were restored. If a directory was restored tell the owner that any new files on that directory have been lost. If any files were restored in step 12, tell the owners of lost files that they can do a "ls -l /" and check if any of their files are listed with a number in the root directory.


17.2 Abnormal Recovery When Possible to Boot


If it is possible to boot but it is not possible to perform the steps described in the preceding section, the system must be restored from the previous dump tape. The following are the steps for restoring the system.

1) Boot the system in a single user mode. This is done by entering 173030 into the console switches by pressing each of the digits in order and then pressing the "LSR" key on the processor console prior to booting. After this has been done, boot in the normal manner (the initial output on the terminal and the login message will not be produced).

2) Run icheck using the "-s" option. Reboot the system in the single user mode when icheck ends.

3) Run restor using the "r" option. Reboot the system in the multiple user mode.

4) Run icheck and dcheck in the normal manner to check if all the errors have been corrected.

5) Inform all the users that the system has been restored to the date and time that the dump tape was made.

## 17.3 Recovery When Impossible to Boot

Sometimes it is impossible to boot UNIX because UNIX or one of the other necessary files have been destroyed. Two tapes are kept to allow a quick recovery when this occurs. One tape has the new version of the tmrk program (ntmrk) and the other has a relatively recent version of the disk dumped with the dd program. The following steps should be used to recover the system.

1) Mount the tape with ntmrk on unit zero and read it in by the procedure described in "Setting up UNIX" entering ntmrk in place of tmrk.

2) Mount the dd dump as unit zero and enter a disk and tape offset as zero and a count of 18000.

3) Halt the processor and then proceed as described in section 17.2 except the UNIX to be loaded the first time should be the UNIX name listed on the dd dump tape label.


## 17.4 Clearing Disk Errors

Sometimes the disk system writes with an error when the system loses power. This causes an unrecoverable disk error. If these errors inhibit the recovery of the system, they can be cleared by writing on the block with the error. The block from the disk up to and including the block with the error can be copied to magnetic tape by the command:

        dd if=<disk> of=/dev/rmt0 count=<cnt>

where <disk> is "/dev/rk" or "/dev/rp00" as appropriate and <cnt> is the block number plus one. The data should be copied back by the following command:

        dd if=/dev/rmt0 of=<disk>


## 18. Day Tape System Crash Repair, DTREPAIR

This program checks and corrects the day tape file system after a system crash or disk failure.

18.1 Standard Operations and Messages

The program is initiated by entering:

        dtrepair<CR>

in response to the system request for next command designated by "%".

The first message is:

        day tape system crash repair program

This message is followed by the question:

        Number of file systems n?

where n is the current number of file systems.  If the current  number
is correct enter <CR> else enter the correct number of file systems.

The following message and questions will be produced for each  of
the file systems.

        file system = /dev/rp xx?

where xx is the number of the file system.  If the number  is  correct
enter <CR> else enter the correct number of this file system.

The program then will check the  size  of  the  file  system  and
print:

        file system has iiiii free 2000 byte records.

where iiiii is the number of free blocks.

The number of 2000 byte blocks for the file system is entered  in
response to the question:

        Size nnnnn?

where nnnnn is the current number of blocks for the file  system.   If
the  current  is  correct  enter <CR> else enter the correct number of
blocks in integer form.

The number of free blocks is determined by the question:

        free nnnnn?

where nnnnn is the number of free blocks for the file system.  If  the
current  is  correct  enter <CR> else enter the correct number of free
blocks in integer form.

After these questions are repeated for each file system, the amount of data for each volume is determined by the question:

Amount of data for volume v f.f?

where v is the volume number and f.f is the current amount of data for the volume. If the current amount of data is correct enter <CR> else enter the correct amount followed by <CR>. This question is repeated for each volume.

The amount of data for the day is determined by the question:

Amount of data for day f.f?

where f.f is the current amount of data for the day. If the current amount is correct enter <CR> else enter the correct amount of data for the day followed by <CR>.

The approximate size of the system span is printed in the message:

Approximate size of system span is f.f

where f.f is the approximate size of the system span.

The system span is asked for by the question:

System span = f.f?

where f.f is the current system span. If it needs no correcting enter <CR> else enter the floating point number of the new system span followed by <CR>.

The next questions are to correct the dates of the system.

earliest day on system = yyyy,ddd?
latest day on system = yyyy,ddd?
date of last volume 1 day tape = yyyy,ddd?
Upper limit of system span = yyyy,ddd?
Beginning day for file system cycle = yyyy,ddd?

where yyyy,ddd is the current date on the system for each entry. If the current date is correct enter <CR> else enter the correct date for each question.

The final question is:

Time between reading and writing f.f?

where f.f is the current time between the two. If the current time is correct enter <CR> else enter the correct time followed by <CR>.